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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHRISTOPHER J. BULIAN, ROBERT C. DYE, STEVEN F. SON, BETTY S. JORGENSEN, and W. LEE PERRY

Appeal 2008-6194
Application 10/629,489
Technology Center 1700

Decided:[1] March 16, 2009

Before BRADLEY R. GARRIS, MICHAEL P. COLAIANNI, and JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

ROBERTSON, *Administrative Patent Judge*.

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[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of all pending claims 1-10. (Appeal Brief filed March 26, 2007, hereinafter "App. Br.," 2). We have jurisdiction pursuant to 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

THE INVENTION

Appellants describe a method for preparing tungsten trioxide nanopowder from a precursor solution comprising ammonium paratungstate and hydrochloric acid (HCl). Appellants state that the method is a simple, scalable, and inexpensive method for preparing tungsten trioxide nanopowder. (Spec. 3, ll. 4-28).

Claims 1, 4, and 7-10, reproduced below, are representative of the subject matter on appeal.

> 1. A solution comprising a combination of ammonium paratungstate and hydrochloric acid.
>
> 4. A method for preparing $WO_3 \cdot H_2O$ comprising preparing a precursor solution comprising a combination of ammonium paratungstate and hydrochloric acid and combining the precursor solution with water to form a precipitate, and isolating the precipitate.
>
> 7. A method for preparing WO_2 comprising preparing a precursor solution comprising ammonium paratungstate and hydrochloric acid, combining the precursor solution with water to form a precipitate, isolating the precipitate, and heating the precipitate to form the anhydrous WO_3 nanopowder, and

reacting the anhydrous WO_3 nanopowder with hydrogen gas to form WO_2.

8. Tungsten trioxide hydrate ($WO_3 \cdot H_2O$) nanosized particles prepared by combining water with a precursor solution comprising a combination of ammonium paratungstate and hydrochloric acid.

9. Tungsten trioxide hydrate ($WO_3 \cdot H_2O$) nanosized particles having a platelet morphology.

10. Tungsten trioxide (WO_3) nanosized particles having a platelet morphology.

THE REJECTIONS

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Redanz	US 2,993,755	July 25, 1961
Sato	US 3,452,106	June 24, 1969
Baresel	US 3,902,917	Sep. 2, 1975
Sherman	US 2002/0005145 A1	Jan. 17, 2002

The Examiner rejected claim 10 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Sherman. The Examiner rejected claims 1-6 and 8-10 under 35 U.S.C. § 103(a) as being unpatentable over Redanz in view of Baresel. The Examiner rejected claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Redanz in view of Baresel and Sato.

Rejection of claim 10 as being anticipated by and/or obvious over Sherman

The Examiner found that Sherman describes nanosized particles of tungsten trioxide having platelet morphology. (Examiner's Answer entered July 27, 2007, hereinafter "Ans.," 3). In the alternative, the Examiner determined that it would have been obvious to produce nanosized tungsten trioxide having a platelet morphology based on the desired properties of the end product and the limited number of compound and geometries Sherman discloses. (Ans. 4).

Appellants contend that Sherman discloses tungsten trioxide and platelet morphology in separate lists, but that Sherman does not associate tungsten trioxide with platelets. (App. Br. 10). Appellants also argue that Sherman does not provide enablement or written description for platelet shaped nanoparticles of tungsten trioxide. (App. Br. 10).

ISSUES

Have Appellants shown that the Examiner reversibly erred in finding that Sherman discloses tungsten trioxide nanosized particles having a platelet morphology?

Have Appellants shown that the Examiner reversibly erred in determining tungsten trioxide nanosized particles having a platelet morphology would have been obvious over Sherman?

We answer these questions in the negative.

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

1. Appellants' Specification states, "[f]or the purposes of this invention, nanopowders are defined as powders of nanoparticles, a nanoparticle being a nanosized particle having all dimensions less than one micron." (Spec. 5, ll. 18-21).

2. Appellants' Specification states:

> the solubility of ammonium paratungstate is higher in a more concentrated hydrochloric acid solution. In addition, when an aqueous solution that is less concentrated in hydrochloric acid is used, the solution is unstable and large particles (larger than nanosized) crystallize spontaneously from solution. . . . After preparing the precursor solution, the next step is to pour the precursor solution into a much larger volume of water. This rapid combination is necessary to crash precipitate the solid and minimize the formation of larger than nanosized particles. (Spec. 5, l. 27 – p. 6, l. 7).

3. Sherman describes photocatalyst particles where the average size of the photocatalyst particle is about 1 nm to about 100 nm. (¶ [0206]).

4. Sherman states, "[p]referred photocatalyst particles are anatase titanium dioxide, zinc oxide, tungsten trioxide, and the above mixtures or composites thereof." (¶ [0208]).

5. Sherman states, "[t]he shape of the photocatalyst particles can be spherical, equiaxial, rod-like or platelet. Preferably, the photocatalytic particle is equiaxial or spherical to minimize oil absorption." (¶ [0209]).

PRINCIPLES OF LAW

A reference teaching a chemical mixture containing two components, each named by the reference anticipates a claim to the chemical mixture, even though the combination may not have been actually made. *In re Sivaramakrishnan*, 673 F.2d 1383, 1384-85 (CCPA 1982). *See also In re Petering*, 301 F.2d 676, 681-82 (CCPA 1962) (generic formula containing only 20 compounds anticipated claimed compound, where there were a limited number of alternatives for the variables).

"It is not, however, necessary that an invention disclosed in a publication shall have actually been made in order to satisfy the enablement requirement." *In re Donohue*, 766 F.2d 531, 533 (Fed. Cir. 1985). A reference is presumed operable until applicant provides evidence rebutting the presumption of operability. *In re Sasse*, 629 F.2d 675, 681-82 (CCPA 1980).

ANALYSIS

Appellants argue that Sherman discloses tungsten trioxide as one of many compounds and platelets as one of many shapes. Appellants' arguments are not persuasive. Although Sherman generally discloses many compounds that may be used as catalyst particles, Sherman expressly discloses tungsten trioxide in a list of only three specific compounds. (FF 4). Further, Sherman discloses platelets as one of only four shapes of particles. (FF 5). Thus, Sherman clearly names both the specific compound and particle shape, and therefore describes tungsten trioxide having a platelet morphology within the meaning of 35 U.S.C. § 102. *See Sivaramakrishnan*, supra.

In addition, Appellants have not presented any persuasive evidence that Sherman does not enable or describe the claimed tungsten trioxide nanosized particles having a platelet morphology, sufficient to overcome the presumption of operability of Sherman. *See Sasse*, supra. Therefore, Appellants' arguments are not persuasive.

We also affirm the Examiner's rejection of claim 10 under 35 U.S.C. § 103 for the reasons discussed above. *See In re Fracalossi*, 681 F.2d 792, 794 (CCPA 1982)("lack of novelty is the ultimate of obviousness").

Rejection of claims 1-10 as being obvious over Redanz in view of Baresel or in further combination with Sato

In rejecting the claims, the Examiner found that Redanz teaches solutions of ammonium paratungstate and hydrochloric acid, methods of preparing tungsten trioxide hydrate and tungsten trioxide, tungsten trioxide hydrate, and tungsten trioxide. (Ans. 4-5). The Examiner found that Redanz failed to teach hydrochloric acid that comprises an aqueous solution of 35-38 weight percent HCl and a method for preparing anhydrous tungsten trioxide nanopowder comprising heating a precipitate of tungsten trioxide hydrate at a temperature of 200ºC to 400ºC. (Ans. 4-5). The Examiner found that Baresel teaches a process for making tungsten trioxide, where ammonium tungstate is mixed with concentrated HCl, having 37% HCl. (Ans. 5). The Examiner found that Baresel teaches that tungstic acid is heated at temperatures of 200ºC for the purpose of expelling water to produce tungsten trioxide. (Ans. 5). The Examiner determined it would have been obvious to use 37% HCl solution taught by Baresel as the concentrated solution in Rendanz. (Ans. 5). The Examiner determined that the

combination of Rendanz and Baresel would inherently produce nanosized particles having platelet morphology. (Ans. 6).

Appellants contend that Redanz does not teach solutions of ammonium paratungstate and hydrochloric acid, because the slurries disclosed in Redanz have liquid and solid phases. (App. Br. 5 and 6). Appellants argue that neither Redanz nor Baresel disclose tungsten trioxide hydrate, nanosized particles, or platelet morphology. (App. Br. 7-9).

ISSUE

Have Appellants shown that the Examiner reversibly erred in determining that the appealed claims would have been obvious over Redanz in view of Baresel or further in view of Sato?

We answer this question in the affirmative.

ADDITIONAL FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

6. Redanz describes a method for preparing tungstic oxide from ammonium paratungstate having a controlled particle size of 1.0 to 5.0 microns. (Col. 1, ll. 51-65).

7. Redanz discloses an example where:

> ammonium paratungstate was slurried with 1500 cc. of water and heated to 60 to 70° C. This slurry was added (hot) to 1300 cc. of concentrated chemically pure hydrochloric acid. The slurry was agitated in a 4-liter beaker for 2 to 3 hours at 75 to 80° C. and then allowed to stand for a 24-hour period to settle and cool. After the resulting solution was decanted, a yellow cake (H_2WO_4) resulted which was washed by decantation with 1000 cc. of water.

(Col. 2, ll. 47-56).

8. Baresel describes a method for preparing tungsten trioxide where a solution of concentrated HCl (37% HCl by weight) is added to a solution of ammonium tungstate. (Col. 4, ll. 24-47).

9. Baresel discloses that a precipitate of tungstic acid hydrate is "heated to a temperature of 200ºC in air for such a period as to expel the water of crystallization and the water formed by dehydration of H_2WO_4 therefrom and leave a finely divided tungsten trioxide (WO_3)." (Col. 4, ll. 42-46).

10. Sato discloses that tungsten trioxide is reduced to an oxide of lower valency by passing through a reactor comprising hydrogen gas. (Col. 5, ll. 37-44).

PRINCIPLES OF LAW

As the Court in *KSR* stated, "[o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit. *See In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness")." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1740-41 (2007).

ANALYSIS

As argued by Appellants, Redanz discloses a slurry of ammonium paratungstate in water and hydrochloric acid, and therefore contains both a liquid and solid phase. (App. Br. 5, FF 7). Redanz's slurry is contrary to the solution required in claim 1, which is a homogeneous mixture having a single phase. (*See* App. Br. 5). The Examiner argues that that the "resulting solution" in Redanz's example is "substantially similar" to the solution claimed. (Ans. 9). However, the Examiner has not provided a sufficient rational underpinning to support the position that the resulting solution disclosed in Redanz's example contains ammonium paratungstate and HCl as recited in claim 1. Specifically, Redanz discloses that hydrated H_2WO_4 is formed as the product of the slurry. (FF 7). Redanz also does not disclose that the resulting solution decanted away from the H_2WO_4 cake contains ammonium paratungstate and hydrochloric acid. (*See* FF 7).

Further, Redanz discloses a slurry containing significant amounts of water. (FF 7). Although we agree with the Examiner that claim 1 does not specify the amount of water present (Ans. 10), claim 1 requires that ammonium paratungstate and HCl are present in a solution. Redanz expressly contradicts the Examiner's position by preparing a slurry of ammonium paratungstate in water prior to forming a slurry with concentrated hydrochloric acid. (FF 7). Moreover, Redanz's disclosure of a slurry rather than a solution is consistent with Appellants' Specification. Appellants' Specification states that the solubility of ammonium paratungstate is higher in more concentrated hydrochloric acid and that when an aqueous solution of less concentrated hydrochloric acid is used, large particles will crystallize spontaneously from solution. (FF 2). Thus,

Appellants have sufficiently demonstrated that the Examiner erred in determining that Redanz discloses a solution of ammonium paratungstate and hydrochloric acid as required by claim 1.

In addition, Redanz in view of Baresel does not disclose nanosized particles as required by claim 8. Redanz teaches particles ranging from 1.0 - 5.0 microns. (FF 6). Appellants define nanosized in the Specification to include particles where all dimension are less than 1.0 micron. (FF 1). Therefore, Redanz teaches particle sizes above Appellants' recited size. The presence of the quantities of water disclosed by Redanz also indicates that the size of the tungsten trioxide particles produced would be larger than nanosized particles. (*See* FF 2 and 7). Thus, Redanz in view of Baresel fails to teach or suggest tungsten trioxide having nanosized particles as required by claim 8.

As the rejection of claim 7 also relies on the combination of Redanz and Baresel, and Sato fails to make up for the deficiencies discussed above, we also reverse the rejection of claim 7.

CONCLUSION

Appellants have failed to demonstrate that the Examiner erred in determining tungsten trioxide nanosized particles having a platelet morphology is anticipated by Sherman.

Appellants have failed to demonstrate that the Examiner erred in determining tungsten trioxide nanosized particles having a platelet morphology would have been obvious over Sherman.

Appellants have shown that the Examiner erred in determining that the appealed claims would have been obvious over Redanz in view of Baresel or further in view of Sato.

ORDER

We affirm the Examiner's decision rejecting claim 10 under 35 U.S.C. § 102(b) as anticipated by Sherman.

We affirm the Examiner's decision rejecting claim 10 under 35 U.S.C. § 103(a) as being unpatentable over Sherman.

We reverse the Examiner's decision rejecting claims 1-6 and 8-10 under 35 U.S.C. § 103(a) as being unpatentable over Redanz in view of Baresel.

We reverse the Examiner's decision rejecting claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Redanz in view of Baresel and Sato.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. §1.136(a)(1)(iv).

AFFIRMED-IN-PART

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